



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/004,487	10/24/2001	Eric A. Livesay	119929-1033	9415

7590 05/23/2005

Gardere Wynne Sewell LLP
3000 Thanksgiving Tower
Suite 3000
1601 Elm Street
Dallas, TX 75201-4767

EXAMINER

FORMAN, BETTY J

ART UNIT	PAPER NUMBER
----------	--------------

1634

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/004,487

Applicant(s)

LIVESAY ET AL.

Examiner

BJ Forman

Art Unit

1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 18-61, 64-69 and 71-86 is/are pending in the application.
- 4a) Of the above claim(s) 59, 60 and 74-86 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18-58, 64-69 and 71-73 is/are rejected.
- 7) ☒ Claim(s) 28 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

FINAL ACTION

Status of the Claims

1. This action is in response to papers filed 28 February 2005 in which claims 1-16, 18-45, 47-53, 55-58, 61, 64-69 and 71-73 were amended and claims 17, 62-63 and 70 were canceled. All of the amendments have been thoroughly reviewed and entered. The previous rejections in the Office Action dated 28 November 2004, not reiterated below, are withdrawn in view of the amendments. Applicant's arguments have been thoroughly reviewed but are deemed moot in view of the amendments, withdrawn rejections and new grounds for rejection. New grounds for rejection, necessitated by amendment, are discussed.

Claims 59-60 and 74-86 are withdrawn from consideration.

Claims 1-16, 18-58, 61, 64-69 and 71-73 are under prosecution.

Claim Objections

2. Claim 28 is objected to because of the following informalities: The claim has been amended to depend from itself. For purposes of examination, the claim is interpreted as depending from Claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Art Unit: 1634

4. Claims 1-16, 18-58 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The recitation "substantially horizontal" is added to the newly amended independent Claims 1 and 56-58 (from which Claims 2-16 and 18-55 depend). The added language defines movement of the substrate with respect to the manifold. Applicant has not pointed to any support in the specification for the newly added limitations and a text search of the entire document has not revealed any such support. Therefore, the specification fails to define or provide any disclosure to support such claim recitation.

The recitation "dynamically adjustable openings" is added to newly amended Claim 41. The added language defines a structure of the mask. Applicant has not pointed to any support in the specification for the newly added limitations and a text search of the entire document has not revealed any such support. Therefore, the specification fails to define or provide any disclosure to support such claim recitation.

The recitation "disposed under the substrate" is added to newly amended Claims 56-58. The added language defines the position of the linear drive relative to the substrate. Applicant has not pointed to any support in the specification for the newly added limitations and a text search of the entire document has not revealed any such support. Therefore, the specification fails to define or provide any disclosure to support such claim recitation.

MPEP 2163.06 notes "If NEW MATTER IS ADDED TO THE CLAIMS, THE EXAMINER SHOULD REJECT THE CLAIMS UNDER 35 U.S.C. 112, FIRST PARAGRAPH - WRITTEN DESCRIPTION REQUIREMENT. *IN RE RASMUSSEN*, 650 F.2d 1212, 211 USPQ 323 (CCPA 1981)." MPEP 2163.02 teaches that "Whenever the issue arises, the fundamental factual inquiry is whether a claim defines an invention that is clearly conveyed to those skilled in the art at the time the application was filed...If a claim is amended to include subject matter, limitations, or terminology not present in the application as filed, involving a departure from, addition to, or deletion from the disclosure of the application as filed, the examiner should conclude that the claimed subject matter is not

Art Unit: 1634

described in that application.” MPEP 2163.06 further notes “WHEN AN AMENDMENT IS FILED IN REPLY TO AN OBJECTION OR REJECTION BASED ON 35 U.S.C. 112, FIRST PARAGRAPH, A STUDY OF THE ENTIRE APPLICATION IS OFTEN NECESSARY TO DETERMINE WHETHER OR NOT “NEW MATTER” IS INVOLVED. *APPLICANT SHOULD THEREFORE SPECIFICALLY POINT OUT THE SUPPORT FOR ANY AMENDMENTS MADE TO THE DISCLOSURE*” (emphasis added).

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 61, 64-69 and 71-73 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 61, 64-69 and 71-73 are indefinite in Claim 61 because the claim is drawn to a “mask”. The claim defines the mask thorough-holes as being “positioned to work in cooperation with defined portions of a substrate, the portions of the substrate being one or more wells”. Because the mask does not comprise a substrate, it is unclear how the substrate and/or wells limits the mask. Furthermore, it is unclear how a mask could comprise a substrate whereby the claim recitation would limit the structure of the mask.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1634

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-7, 9, 11-14, 16, 18-29, 44-48, 51-55 are rejected under 35 U.S.C. 102(b) as being anticipated by Brennan (U.S. Patent No. 5,814,700, issued 29 September 1998) as defined by Merriam-Webster (Ninth New Collegiate Dictionary, 1991, page 724).

Regarding Claim 1, Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets, the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive (transportation mechanism) for moving the substrate horizontally with respect to the manifold as indicated by direction arrow #60 (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7). Brennan describes the manifold as a bank of nozzles. While Brennan does not refer to the bank as a manifold, the term "manifold" is commonly defined as "a whole that unites or consists of many diverse elements" (Merriam-Webster, page 724). The nozzle bank of Brennan unites "independent dispensing tubes" into one mounting block #37. Therefore, given the common definition of manifold provided by Merriam-Webster, Brennan's bank of nozzles is encompassed by the claimed manifold.

Regarding Claim 2, Brennan discloses the apparatus wherein the outlets from a linear array of spray heads i.e. row of nozzles (40, column 6, lines 25-28).

Regarding Claims 3-6, Brennan discloses the apparatus is for delivery of chemicals for nucleic acid or peptide synthesis (Column 3, lines 32-35). However, the claim recitations describe an intended use for the apparatus of Claim 1. The recitations of intended use do not define or further limit the apparatus of Claim 1 because the recitations do not further limit the structure of the apparatus.

Regarding Claim 7, Brennan discloses the apparatus comprising a manifold for delivering acetonitrile, a manifold for delivering an oxidizer, a manifold for delivering a capping

Art Unit: 1634

reagent, a manifold for delivering one or more monomers, and a manifold for delivering a deblocking reagent i.e. each bank of nozzles is coupled to a different reagent (Column 6, lines 44-65 and Example 1, Column 21-45).

Regarding Claim 9, Brennan discloses the apparatus wherein the substrate is chemically non-reactive i.e. inert (Column 6, lines 13-14).

Regarding Claim 11, Brennan discloses the apparatus wherein the substrate is frit made of polyethylene (Column 11, lines 29-30).

Regarding Claim 12, Brennan discloses the apparatus wherein the substrate is fiber glass (Column 10, lines 51-52).

Regarding Claim 13, Brennan discloses the apparatus wherein the substrate is glass fiber glass (Column 10, lines 51-52). The courts have stated that claims must be given their broadest reasonable interpretation consistent with the specification *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997); *In re Prater*, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969); and *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) (see MPEP 2111). The claims are given the broadest reasonable interpretation consistent with the indefinite claim language wherein "glass Micro-fiber filter" are not defined. Brennan teaches a glass fiber filter for selective passage of solution. Given the broadest reasonable interpretation, the selective filter of Brennan is encompassed by the claimed filter.

Regarding Claim 14, Brennan discloses the apparatus wherein the substrate is chemically non-reactive i.e. inert (Column 6, lines 13-14).

Regarding Claim 16, Brennan discloses the apparatus wherein the reaction sites are wells (#26, Column 6, lines 5-7).

Regarding Claim 18, Brennan discloses the apparatus wherein the wells have a filter (Column 10, lines 51-52).

Art Unit: 1634

Regarding Claim 19, Brennan discloses the apparatus wherein the wells have a slanted interior edge (#26, Column 10, lines 1-46 and Fig. 6).

Regarding Claim 20, Brennan discloses the apparatus wherein the substrate comprises a top portion (#25) and a bottom portion comprising wells #32 (Fig. 3).

Regarding Claim 21, Brennan discloses the apparatus wherein the wells have a slanted cross-section (#26, Column 10, lines 1-46 and Fig. 6).

Regarding Claim 22, Brennan discloses the apparatus wherein the wells have a slanted cross-section and a frit (#26, Column 10, lines 51-52 and Fig. 6).

Regarding Claim 23, Brennan discloses the apparatus wherein the wells have first and second slanted portions i.e. adjacent walls of the wells are each slanted (#26, Column 10, lines 1-46 and Fig. 6). Furthermore, the interior and exterior walls of the wells are each slanted thereby providing first second slanted portions.

Regarding Claim 24, Brennan discloses the apparatus wherein the wells have first and second slanted portions i.e. the interior and exterior walls of the wells are each slanted thereby providing first second slanted portions wherein a frit is fixed within the interior slants (#26, Column 10, lines 47-58 and Fig. 6).

Regarding Claim 25, Brennan discloses the apparatus wherein the wells include a synthesis substrate e.g. CPG (Column 12, lines 5-28).

Regarding Claim 26, Brennan discloses the apparatus further comprising a computer operably connected to the linear drive (Column 11, lines 61-Column 12, line 4 and Column 13, line 50- Column 14, line 60).

Regarding Claim 27, Brennan discloses the apparatus further comprising a reservoir (#23) in fluid communication with each manifold (Column 5, lines 58-59 and Fig. 7).

Regarding Claim 28, Brennan discloses the apparatus further comprising a computer operably connected to and controlling valves (#55) for controlling fluid communication (Column 11, lines 61-Column 12, line 4 and Column 13, line 50- Column 14, line 60).

Art Unit: 1634

Regarding Claim 29, Brennan discloses the apparatus further comprising reservoirs (#23) in fluid communication with each manifold and valves (#55) for controlling fluid flow from reservoirs to manifolds (Column 5, lines 58-59, Column 7, lines 53-59 and Fig. 7).

Regarding Claim 44, Brennan discloses the apparatus further comprising a vacuum in operable communication with the substrate (Column 11, lines 46-60).

Regarding Claim 45, Brennan discloses the apparatus wherein the reaction sites have protected reactive groups (Example 1, Column 13, lines 21-27).

Regarding Claim 46, Brennan discloses the apparatus wherein the protecting group is removed by adding a deblocking agent (Example 1, Column 13, lines 21-32).

Regarding Claim 47, Brennan discloses the apparatus wherein the reactive sites have nucleic acid monomers (Example 1, Column 13, lines 21-35).

Regarding Claim 48, Brennan discloses the apparatus wherein the reactive sites have monomers for peptide synthesis (Column 3, lines 32-35 and Column 4, lines 43-60).

Regarding Claim 51, Brennan discloses the apparatus wherein the reactive sites have a linker i.e. the first monomer linked to the CPG via 3-succinate linkage (Column 12, lines 5-8).

Regarding Claim 52, Brennan discloses the apparatus wherein the reactive sites have a small molecule library i.e. nucleotide-derived CPG wherein the nucleotide is the small molecule and the library contains at least one member (Column 12, lines 5-16).

Regarding Claim 53, Brennan discloses the apparatus wherein the substrate comprises 96 wells (Column 6, lines 5-10).

Regarding Claim 54, Brennan discloses the apparatus wherein the substrate is rectangular (Column 6, lines 5-10 and Fig. 1).

Regarding Claim 55, Brennan discloses the apparatus wherein the reaction sites comprise wells that are canted i.e. a slanted interior edge (#26, Column 10, lines 1-46 and Fig. 6).

9. Claims 61 and 64 are rejected under 35 U.S.C. 102(e) as being anticipated by Schultz et al (U.S. Patent No. 6, 004,617, issued 21 December 1999).

Regarding Claim 61, Schultz et al disclose a mask comprising a non-reactive sheet (e.g. inorganic glass or plastics (Column 13, lines 15-25) and non-wetting (Column 21, lines 58-60) having a top and bottom surface (Fig. 1) and through-holes that are defined and positioned to work in cooperation with defined portions of a substrate (Column 19, lines 42-45) wherein the substrate comprises the reaction sites are depressions or recesses and/or separated by barrier or wall (i.e. wells, Column 14, line 63-Column 15, line 8).

Regarding Claim 64, Schultz et al disclose the mask is chemically non-reactive material i.e. non-wetting (Column 21, lines 58-60)

Response to Arguments

10. Applicant asserts that Schultz et al do not teach every element of the claim. Applicant has not pointed to any specific element that is missing. As detailed above, it is opinion of the Office, that Schultz does teach every structural element of the claimed mask.

11. Claims 61, 64, 65 and 69 are rejected under 35 U.S.C. 102(b) as being anticipated by Morozov et al (WO 98/58745, published 30 December 1999).

Regarding Claim 61, Morozov et al disclose a mask comprising a non-reactive sheet (e.g. Teflon, page 45, line 25) having a top and bottom surface and through-holes that are defined and positioned to work in cooperation with defined portions of a substrate (Fig. 3-4, #62, and page 12, lines 21-33). As stated above, because the claim is drawn to a mask that does not comprise a substrate, it is unclear how the substrate described in the claim defines the claimed mask.

Art Unit: 1634

Regarding Claim 64, Morozov et al disclose the mask is chemically non-reactive material (e.g. Teflon, page 45, line 25).

Regarding Claim 65, Morozov et al disclose the mask is Teflon (page 45, line 25).

Regarding Claim 69, Morozov et al disclose the mask is polypropylene (page 14, line 25-30).

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 8, 30-32, 56-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (U.S. Patent No. 5,814,700, issued 29 Sept 1998) in view of Schultz et al (U.S. Patent No. 6, 004,617, issued 21 December 1999).

Regarding Claims 8 and 30-32, Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets, the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive (transportation mechanism) for moving the substrate horizontally with respect to the manifold as indicated by direction arrow #60 (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7). Brennan further teaches the apparatus wherein the nozzles and wells are aligned for delivery of selected reagent (Column 5, lines 65-67) but does not teach a mask positioned on an upper surface of the substrate.

Art Unit: 1634

However, masked reagent delivery was well known in the art at the time the claimed invention was made as taught by Schutlz et al who teach a similar apparatus for synthesis comprising delivery nozzles and substrate wherein a mask comprising multiple through holes is positioned over the substrate wherein the mask defines the reaction region to a desired dimension e.g. 5nl drop into a 300um or less region (Column 12, lines 28-30). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the mask comprising multiple through holes aligned with the reaction sites of Schultz et al to the synthesis apparatus of Brennan. One of ordinary skill in the art would have been motivated to do so for the expected benefit of accurately defining the reaction region as desired by Schultz et al (Column 12, lines 28-30).

Regarding Claim 56, Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets, the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive disposed under the substrate as indicated by direction arrow #60 (Column 8, lines 8-10) for moving the substrate horizontally with respect to the manifold (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7).

Brennan further teaches the apparatus wherein the nozzles and wells are aligned for delivery of selected reagent (Column 5, lines 65-67) but does not teach a mask positioned on an upper surface of the substrate. However, masked reagent delivery was well known in the art at the time the claimed invention was made as taught by Schutlz et al who teach a similar apparatus for synthesis comprising delivery nozzles and substrate wherein a mask comprising multiple through holes is positioned over the substrate wherein the mask defines the reaction region to a desired dimension e.g. 5nl drop into a 300um or less region (Column 12, lines 28-30). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the mask comprising multiple through holes aligned with the

Art Unit: 1634

reaction sites of Schultz et al to the synthesis apparatus of Brennan. One of ordinary skill in the art would have been motivated to do so for the expected benefit of accurately defining the reaction region as desired by Schultz et al (Column 12, lines 28-30).

Regarding Claim 57, Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets, the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive disposed under the substrate as indicated by direction arrow #60 (Column 8, lines 8-10) for moving the substrate horizontally with respect to the manifold (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7) and a vacuum disposed below the substrate (Column 11, lines 47-60 and Fig. 1).

Brennan further teaches the apparatus wherein the nozzles and wells are aligned for delivery of selected reagent (Column 5, lines 65-67) but does not teach a mask positioned on an upper surface of the substrate. However, masked reagent delivery was well known in the art at the time the claimed invention was made as taught by Schultz et al who teach a similar apparatus for synthesis comprising delivery nozzles and substrate wherein a mask comprising multiple through holes is positioned over the substrate wherein the mask defines the reaction region to a desired dimension e.g. 5nl drop into a 300um or less region (Column 12, lines 28-30). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the mask comprising multiple through holes aligned with the reaction sites of Schultz et al to the synthesis apparatus of Brennan. One of ordinary skill in the art would have been motivated to do so for the expected benefit of accurately defining the reaction region as desired by Schultz et al (Column 12, lines 28-30).

Regarding Claim 58, Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets,

Art Unit: 1634

the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive disposed under the substrate as indicated by direction arrow #60 (Column 8, lines 8-10) for moving the substrate horizontally with respect to the manifold (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7) and a vacuum disposed below the substrate (Column 11, lines 47-60 and Fig. 1). Brennan further discloses the apparatus comprises a manifold for delivering acetonitrile, a manifold for delivering an oxidizer, a manifold for delivering a capping reagent, a manifold for delivering one or more monomers, and a manifold for delivering a deblocking reagent i.e. each bank of nozzles is coupled to a different reagent (Column 6, lines 44-65 and Example 1, Column 21-45).

Brennan further teaches the apparatus wherein the nozzles and wells are aligned for delivery of selected reagent (Column 5, lines 65-67) but does not teach a mask positioned on an upper surface of the substrate. However, masked reagent delivery was well known in the art at the time the claimed invention was made as taught by Schutlz et al who teach a similar apparatus for synthesis comprising delivery nozzles and substrate wherein a mask comprising multiple through holes is positioned over the substrate wherein the mask defines the reaction region to a desired dimension e.g. 5nl drop into a 300um or less region (Column 12, lines 28-30). It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the mask comprising multiple through holes aligned with the reaction sites of Schultz et al to the synthesis apparatus of Brennan. One of ordinary skill in the art would have been motivated to do so for the expected benefit of accurately defining the reaction region as desired by Schultz et al (Column 12, lines 28-30).

14. Claims 10, 15, 49 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (U.S. Patent No. 5,814,700, issued 29 Sept 1998).

Art Unit: 1634

Regarding Claims 10 and 15 Brennan discloses an apparatus comprising a substrate (#32) having an upper and lower surface and one or more reaction sites (wells, #26), a first manifold (bank of nozzles, #37, Fig. 7), the manifold having at least one inlet and two or more outlets, the outlets positioned to deliver chemicals to the reaction sites (i.e. the nozzles align with reaction wells, Column 5, lines 65-66) and a linear drive (transportation mechanism) for moving the substrate horizontally with respect to the manifold as indicated by direction arrow #60 (Column 5, line 55-Column 6, line 18 and Fig. 3 and 7). Brennan teach the apparatus comprising a substrate but are silent regarding a Delrin or slanted substrate. However, the courts have stated that absent evidence to the contrary, a particular configuration of a known device is a matter of choice which would have been obvious to one skilled in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) (The court held that the configuration of the claimed disposable plastic nursing container was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed container was significant.). One of ordinary skill in the art would have expected the claimed configurations to function in an equal fashion. Therefore, the claimed configuration would have been an obvious matter of choice to one skilled in the art.

Regarding Claim 49 and 50, Brennan discloses the apparatus as described above wherein the apparatus is used for synthesis of "any polymer chain" (Column 5, lines 48-51) which clearly suggests the apparatus is useful for the claimed polymer chains i.e. PNA and carbohydrates. It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to apply the apparatus of Brennan to PNA and carbohydrate synthesis and to provide a PNA and carbohydrate monomers at the reaction sites based on the clear suggestion of Brennan to do so (Column 5, lines 48-51).

Art Unit: 1634

15. Claims 33-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brennan (U.S. Patent No. 5,814,700, issued 29 Sept 1998) in view of Schultz et al (U.S. Patent No. 6,004,617, issued 21 December 1999) as applied to Claim 30 above and further in view of Morozov et al (WO 98/58745, published 30 December 1998).

Regarding Claim 33-41, Schultz et al teaches the mask comprises adjustable through-holes for matching reaction sites (Column 16, line 65-Column 17, line 5) and comprises various compositions known in the art e.g. plastics, inorganic glasses, resins, polymers etc. (Column 19, lines 37-41). Schultz further teaches the droplets deposited are charged and deposited onto a charged substrate (Column 22, lines 16-41). While Schultz et al teach their mask encompasses a variety of compositions, they do not specifically teach the claimed mask compositions. However, masks comprising various compositions were well known in the art at the time the claimed invention was made as taught by Morozov et al who teach mask comprising an array of through-holes for depositing "distinct spots" onto a substrate (page 12, lines 21-33) wherein their masks are made of various conducting or non-conducting materials based on desired deposition (page 15, lines 13-33) including e.g. polypropylene (page 14, lines 25-26) and Teflon (Example 2, page 45, line 25). Morozov et al further teach adjusting the charge relative to the substrate to thereby direct charged molecule through the holes and onto the substrate as desired (page 15, lines 27-33).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to provide masks of the claimed compositions based on the broad suggestion of Schultz to do so (Column 19, lines 37-41) and based on compositions known in the art taught by Schultz et al and Morozov et al e.g. polypropylene (page 14, lines 25-26) and Teflon (Example 2, page 45, line 25) and having a charge to provide desired deposition focusing (page 15, lines 27-33). One of ordinary skill in the art would have been motivated to do so based on the well known and diverse mask compositions and deposition desired as taught by

Art Unit: 1634

Schultz et al and Morozov et al e.g. plastics, inorganic glasses, resins, polymers, polypropylene, Teflon and etc.

16. Claims 65-69 and 71-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schultz et al (U.S. Patent No. 6, 004,617, issued 21 December 1999) in view of Morozov et al (WO 98/58745, published 30 December 1998).

Regarding Claim 65-69, Schultz et al teaches the mask comprises adjustable through-holes for matching reaction sites (Column 16, line 65-Column 17, line 5) and comprises various compositions known in the art e.g. plastics, inorganic glasses, resins, polymers etc. (Column 19, lines 37-41). Schultz further teaches the droplets deposited are charged and deposited onto a charged substrate (Column 22, lines 16-41). While Schultz et al teach their mask encompasses a variety of compositions, they do not specifically teach the claimed mask compositions. However, masks comprising various compositions were well known in the art at the time the claimed invention was made as taught by Morozov et al who teach mask comprising an array of through-holes for depositing "distinct spots" onto a substrate (page 12, lines 21-33) wherein their masks are made of various conducting or non-conducting materials based on desired deposition (page 15, lines 13-33) including e.g. polypropylene (page 14, lines 25-26) and Teflon (Example 2, page 45, line 25).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to provide masks of the claimed compositions based on the broad suggestion of Schultz to do so (Column 19, lines 37-41) and based on compositions known in the art e.g. polypropylene (page 14, lines 25-26) and Teflon (Example 2, page 45, line 25). One of ordinary skill in the art would have been motivated to do so based on the well known and

Art Unit: 1634

diver mask compositions taught by Schultz et al and Morozov et al e.g. plastics, inorganic glasses, resins, polymers, polypropylene, Teflon and etc.

Regarding Claim 71-73, Schultz et al teach the mask having outlets wherein geometrics of the masks is adjusted relative to the delivery source and substrate to generate desired gradients at the reaction regions (Column 16, line 66-Column 17, line 5). While they do not specifically teach the mask outlets have angles equal to, larger or smaller than the angle of the substrate wells, the reference clearly suggests modifying mask geometry to obtain desired reaction regions. Furthermore, Morozov et al teach projection from the outlets is controlled to provide an angle of projection equal to (Fig. 4A), greater than (electrostatic concentration, Fig. 3A) or less than (electrofocusing, Fig. 3B) based on desired deposition (page 13, line 8-page 15, line 33).

It would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the outlet angle to obtain the claimed angles known in the art as taught by Morozov et al (Fig. 3-4) and based on a desired reaction region as suggested by Schultz et al (Column 16, line 66-Column 17, line 5).

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

Art Unit: 1634

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

18. No claim is allowed.

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BJ Forman whose telephone number is (571) 272-0741. The examiner can normally be reached on 6:00 TO 3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Jones can be reached on (571) 272-0745. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

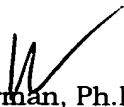
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547.

Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

Art Unit: 1634

For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.


BJ Forman, Ph.D.
Primary Examiner
Art Unit: 1634
May 19, 2005